

## DECLARATION

I, Jun HAYASHI of c/o The Patent Corporate Body ARUGA PATENT OFFICE,  
1-3-6, Nihonbashi Ningyocho, Chuo-ku, Tokyo 103-0013 Japan do solemnly and  
sincerely declare that I well understand both Japanese and English languages and that I  
believe the attached English version is true and complete translation of Japanese patent  
application No. 2002-232733 filed on August 9, 2002 in the name of Kao Corporation.

March 24, 2008

  
Jun HAYASHI

[Document Name] Description

[Title of the Invention] Hair Detergent Compositions

[Claims]

1. A hair detergent composition comprising the following components (a), (b) and (c):

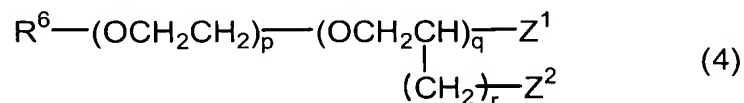
(a) an anionic surfactant,

(b) a carboxylic acid selected from hydroxymonocarboxylic acids, dicarboxylic acids and hydroxydicarboxylic acids, and salts thereof, and

(c) a silicone derivative having, as a side chain thereof bonded to a silicon atom, a group containing both a hydroxyl group and a nitrogen atom.

2. A hair detergent composition of Claim 1, further comprising, as Component (d), an organic solvent selected from the following (d1) to (d5):

(d1) compounds represented by the formula (4):



wherein,  $\text{R}^6$  represents a hydrogen atom, a lower alkyl group or a group  $\text{R}^7\text{-Ph-R}^8\text{-}$  ( $\text{R}^7$ : a hydrogen atom, a methyl group or a methoxy group,  $\text{R}^8$ : a bonding site, or a saturated or unsaturated divalent  $\text{C}_{1-3}$  hydrocarbon group, Ph: a paraphenylene group),  $\text{Z}^1$  and  $\text{Z}^2$  each represents a hydrogen atom or a hydroxyl group, and  $p$ ,  $q$  and  $r$  each stands for an integer of 0 to 5, with the proviso that when  $p=q=0$ ,  $\text{Z}^1$

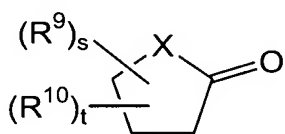
does not represent a hydrogen atom and  $R^6$  represents  
neither a hydrogen atom nor a group  $R^7$ -Ph-,

(d2) N-alkylpyrrolidones having a  $C_{1-18}$  alkyl group  
bonded to a nitrogen atom,

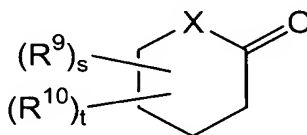
(d3) alkylene carbonates having 1 to 4 carbon atoms,

(d4) polypropylene glycol having a molecular weight  
of 200 to 5000, and

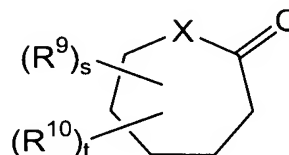
(d5) lactones or cyclic ketones represented by the  
following formula (5), (6) or (7):



(5)



(6)



(7)

wherein, X represents a methylene group or an oxygen atom,  
 $R^9$  and  $R^{10}$  represent substituents, respectively, which are  
different each other, and s and t each stands for 0 or 1.

3. A hair detergent composition of Claim 1 or 2,  
which has pH at 25°C of 4.5 or less when diluted to 20  
times the weight with water.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to hair detergent  
compositions which provide rich foaming during shampooing,

and is capable of give excellent conditioning effects and luster to the hair.

[0002]

[Background Art]

Although hair detergents contain a water soluble cationized polymer for the purpose of giving conditioning effects to the hair, it is not satisfactorily effective. Amino-modified silicones are used as another material for giving excellent conditioning effects to the hair, but they do not exhibit their function sufficiently in hair detergents.

[0003]

[Problem to be Solved by the Invention]

An object of the present invention is to provide a hair detergent composition providing good foaming during shampooing and capable of giving excellent conditioning effects and luster to the hair.

[0004]

[Means for Solving the Problem]

The present inventors have found that a hair detergent composition satisfying the above-described demand is available by using, in combination, an anionic surfactant, a carboxylic acid, and a silicone derivative having a side chain containing both a hydroxyl group and a nitrogen atom.

[0005]

In the present invention, there is thus provided a hair detergent composition containing the following components (a), (b) and (c):

(a) an anionic surfactant,

(b) a carboxylic acid selected from hydroxymonocarboxylic acids, dicarboxylic acids and hydroxydicarboxylic acids, and salts thereof, and

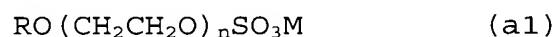
(c) a silicone derivative having, as a side chain thereof bonded to a silicon atom, a group containing both a hydroxyl group and a nitrogen atom.

[0006]

[Mode for Carrying Out the Invention]

As the anionic surfactant of Component (a), sulfate-, sulfonate- and carboxylate-type surfactants are preferred. Specific examples include alkyl sulfates, polyoxyalkylene alkyl ether sulfates, polyoxyalkylene alkenyl ether sulfates, alkylene alkyl phenyl ether sulfates sulfosuccinates, and higher fatty acid salts. Of these, polyoxyalkylene alkyl ether sulfates and alkyl sulfates are preferred, with those represented by the following formula (a1) or (a2) being particularly preferred.

[0007]



[0008]

wherein, R represents a C<sub>10-18</sub> alkyl or alkenyl group, R' represents a C<sub>10-18</sub> alkyl group, M represents an alkali metal, alkaline earth metal, ammonium, alkanolamine or basic amino acid, and n stands for 1 to 5 on weight average.

[0009]

As Component (a), the above-described surfactants may be used either singly or as a combination of two or more thereof. The content of Component (a) in the hair detergent composition of the invention preferably ranges from 0.5 to 60 wt.%, more preferably from 1 to 30 wt.%, especially preferably from 8 to 20 wt.%, from the viewpoints of foaming performance, liquid state upon use and detergency.

[0010]

Examples of the hydroxymonocarboxylic acid serving as Component (b) include glycolic acid, lactic acid, hydroxyacrylic acid, oxybutyric acid and glyceric acid, of which lactic acid and glycolic acid are especially preferred. Examples of the dicarboxylic acid include malonic acid, succinic acid, glutaric acid, adipic acid, maleic acid, fumaric acid, phthalic acid and oxalic acid, of which maleic acid is especially preferred. Examples of the hydroxydicarboxylic acid include malic acid and tartaric acid, of which malic acid is especially preferred.

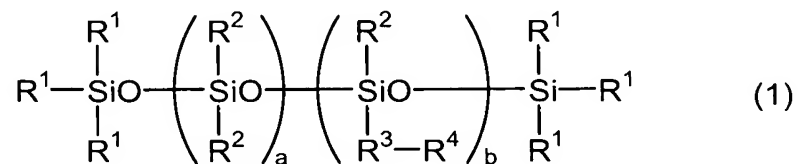
[0011]

As Component (b), these compounds may be used either singly or in combination as a combination of two or more thereof. The content of Component (b) in the hair detergent composition of the invention preferably ranges from 0.05 to 10 wt.%, more preferably from 0.1 to 5 wt.%, especially from 0.5 to 2 wt.% from the viewpoints of improvement in the finish of the hair such as luster and styling ease.

[0012]

The silicone derivative as Component (c) has, as a side chain thereof bonded to a silicon atom, a group containing both a hydroxyl group and a nitrogen atom. Preferred specific examples include those represented by the following formula (1):

[0013]



[0014]

wherein, R<sup>1</sup>s each independently represents a monovalent hydrocarbon group, a hydroxy group or an alkoxy group,

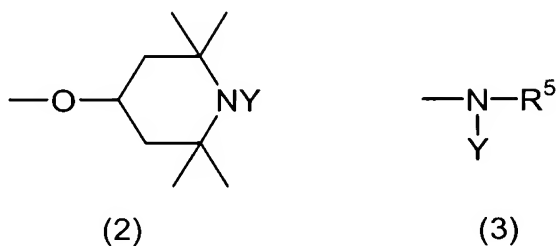
R<sup>2</sup>s each independently represents a monovalent hydrocarbon group,

R<sup>3</sup>s each independently represents a divalent C<sub>1-10</sub>

hydrocarbon group,

$R^4$ s each independently represents a group represented by the following formula (2) or (3):

[0015]



[0016]

wherein,  $Y$ s each independently represents a hydrogen atom or a group:  $-\text{CH}_2\text{CH}(\text{OH})-\text{R}^3-\text{OH}$  ( $\text{R}^3$  has the same meaning as described above),  $\text{R}^5$ s each independently represents a hydrogen atom or a group  $-\text{R}^3\text{NY}_2$  ( $Y$  and  $\text{R}^3$  have the same meanings as described above), with the proviso that  $Y$ s do not represent a hydrogen atom simultaneously,

a stands for 25 to 1000,

b stands for 1 to 200.

[0017]

Examples of the monovalent hydrocarbon group as  $\text{R}^1$  include alkyl groups and aryl groups. As  $\text{R}^1$ ,  $\text{C}_{1-3}$  alkyl groups (particularly, methyl group) and  $\text{C}_{1-15}$ , especially  $\text{C}_{10-15}$  alkoxy groups are preferred.

[0018]

Examples of the monovalent hydrocarbon group as  $\text{R}^2$  include  $\text{C}_{1-6}$  alkyl groups such as methyl, ethyl, propyl,



butyl, pentyl and hexyl, C<sub>6-10</sub> aryl groups such as phenyl, tolyl and xylyl, and C<sub>6-10</sub> aralkyl groups such as benzyl and phenethyl. Of these, alkyl groups, particularly a methyl group is preferred.

[0019]

Examples of the divalent C<sub>1-10</sub> hydrocarbon group as R<sup>3</sup> include alkylene groups such as methylene, ethylene, trimethylene, propylene, tetramethylene, methyltrimethylene, ethylethylene and dimethylethylene, and alkylene-arylene groups as represented by the formula:  $-(CH_2)_2-C_6H_4-$ . Of these, C<sub>2-4</sub> alkylene groups are preferred.

[0020]

When Y represents a group:  $-CH_2CH(OH)-R^3-OH$ , it is preferably a 2,3-dihydroxypropyl group. As R<sup>4</sup>, groups represented by the formula (3) are preferred, while as R<sup>5</sup>, N-(2,3-dihydroxypropyl)aminoethyl and N,N-bis(2,3-dihydroxypropyl)aminoethyl groups are preferred.

[0021]

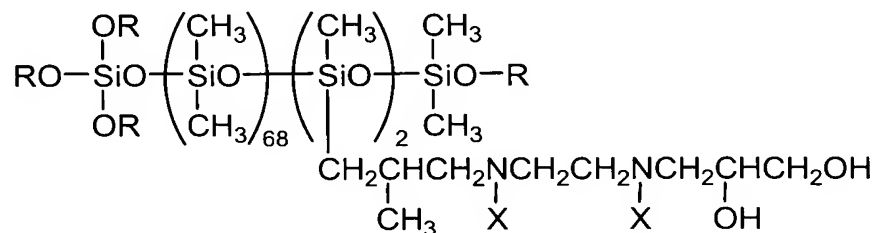
It is preferred that a stands for 75 to 400 and b stands for 1 to 20.

[0022]

The silicone derivative serving as Component (c) can be synthesized, for example, by reacting an amino-modified silicone with an epoxy functional compound such as glycidol as described in EP-0399706A2. Examples of the silicone

derivative as Component (c) include compounds represented by the below-described formula, while those of its commercially available products include "8500 Conditioning Agent" (CAS No. 237753-63-8; product of Dow Corning Corp).

[0023]



R:  $C_{13}H_{27}$  to  $C_{15}H_{31}$

X: 75% for a group:  $-\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$  and 25% for a hydrogen atom

[0024]

As Component (c), two or more of the compounds as described above may be used either singly or in combination. From the viewpoints of smoothness and softness of the hair during the time from shampooing to rinsing, and smoothness of the hair after drying, the content of Component (c) in the hair detergent composition of the present invention preferably ranges from 0.05 to 4 wt.%, more preferably from 0.07 to 2 wt.%, especially preferably from 0.1 to 1.5 wt.%.

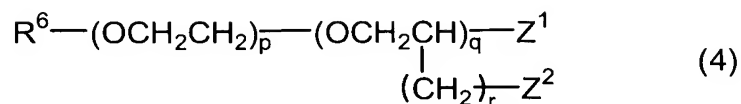
[0025]

The hair detergent composition of the present invention may further contain, as Component (d), an organic solvent selected from the following (d1) to (d5):

[0026]

(d1) compounds represented by the formula (4):

[0027]



[0028]

wherein,  $\text{R}^6$  represents a hydrogen atom, a lower alkyl group or a group  $\text{R}^7\text{-Ph-R}^8\text{-}$  ( $\text{R}^7$ : a hydrogen atom, a methyl group or a methoxy group,  $\text{R}^8$ : a bonding site, or a saturated or unsaturated divalent  $\text{C}_{1-3}$  hydrocarbon group, Ph: a paraphenylene group),  $\text{Z}^1$  and  $\text{Z}^2$  each represents a hydrogen atom or a hydroxyl group, and  $p$ ,  $q$  and  $r$  each stands for an integer of 0 to 5, with the proviso that when  $p=q=0$ ,  $\text{Z}^1$  does not represent a hydrogen atom and  $\text{R}^6$  represents neither a hydrogen atom nor a group  $\text{R}^7\text{-Ph-}$ ,

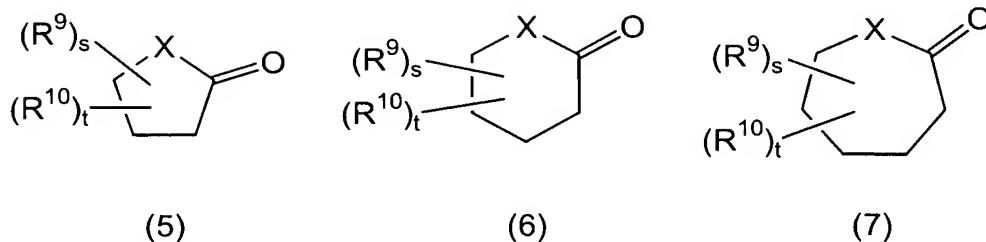
(d2) N-alkylpyrrolidones having a  $\text{C}_{1-18}$  alkyl group bonded to a nitrogen atom,

(d3) alkylene carbonates having 1 to 4 carbon atoms,

(d4) polypropylene glycol having a molecular weight of from 200 to 5000, and

(d5) lactones or cyclic ketones represented by the following formula (5), (6) or (7):

[0029]



[0030]

wherein, X represents a methylene group or an oxygen atom,  $R^9$  and  $R^{10}$  represent substituents, respectively, which are different each other, and s and t each stands for 0 or 1.

[0031]

Of the organic solvents serving as Component (d), those corresponding to (d1) include ethanol, 1-propanol, 2-propanol, butanol, isobutanol, ethylene glycol, propylene glycol, 1,3-butanediol, benzyl alcohol, cinnamyl alcohol, phenethyl alcohol, p-anisyl alcohol, p-methylbenzyl alcohol, phenoxyethanol, 2-benzyloxyethanol, methylcarbitol, ethyl carbitol, propyl carbitol, butyl carbitol, triethylene glycol monoethyl ether, triethylene glycol monobutyl ether, and glycerin; those corresponding to (d2) include N-methylpyrrolidone, N-octylpyrrolidone and N-laurylpyrrolidone; those corresponding to (d3) include ethylene carbonate and propylene carbonate; and, as propylene glycol of (d4), preferred is that having a molecular weight of from 200 to 10000. In (d5), preferred examples of  $R^9$  and  $R^{10}$  in the formulas (5) to (7) include

linear, branched or cyclic alkyl groups, a hydroxyl group, a sulfonic acid group, a phosphoric acid group, a carboxyl group, a phenyl group, sulfoalkyl groups, alkyl phosphate groups and carboxyalkyl groups. Of these, linear or branched C<sub>1-6</sub> alkyl groups substituted at the  $\gamma$ -position in the case of  $\gamma$ -lactone and at the  $\delta$ -position in the case of  $\delta$ -lactone (the position meaning methylene adjacent to the hetero oxygen atom), for example, methyl, ethyl, propyl, isopropyl and butyl groups are preferred. When enhancement of the water solubility of the compounds (5) to (7) is desired, they preferably have, as R<sup>9</sup> or R<sup>10</sup>, an acid group such as sulfonic acid group, phosphoric acid group or carboxyl group, or an alkyl group substituted therewith. Examples of the lactone as (d5) include  $\gamma$ -butyrolactone,  $\gamma$ -caprolactone,  $\gamma$ -valerolactone,  $\delta$ -valerolactone,  $\delta$ -caprolactone and  $\delta$ -heptanolactone. From the viewpoint of stability of the lactone,  $\gamma$ -lactones, especially  $\gamma$ -butyrolactone and  $\gamma$ -caprolactone are preferred. Examples of the cyclic ketone as (d5) include cyclopentanone, cyclohexanone, cycloheptanone and 4-methylcycloheptanone. As Component (d), particularly preferred are benzyl alcohol, benzyloxyethanol, propylene carbonate and propylene glycol.

[0032]

As Component (d), two or more of the compounds as described above may be used either singly or in combination.

The content of the Component (d) in the hair detergent composition of the invention preferably ranges from 0.01 to 50 wt.%, more preferably from 0.1 to 35 wt.%, especially preferably from 0.5 to 10 wt.%, from the viewpoints of feeling upon use, luster and flexibility.

[0033]

To the hair detergent composition of the invention, a nonionic surfactant or amphoteric surfactant may be added in order to improve foaming performance.

[0034]

Examples of the nonionic surfactant include polyoxyalkylene sorbitan fatty acid esters, polyoxyalkylene sorbit fatty acid esters, polyoxyalkylene glycerin fatty acid esters, polyoxyalkylene fatty acid esters, polyoxyalkylene alkyl ethers, polyoxyalkylene alkyl phenyl ethers, polyoxyalkylene (hydrogenated) castor oils, sucrose fatty acid esters, polyglycerin alkyl ethers, polyglycerin fatty acid esters, fatty acid alkanolamides and alkyl glycosides. Of these, alkyl glycosides, polyoxyalkylene alkyl ethers, polyoxyalkylene (C<sub>8</sub> to C<sub>20</sub>) fatty acid esters, polyoxyethylene sorbitan fatty acid esters, polyoxyethylene hydrogenated castor oil, and fatty acid alkanolamides are preferred. As fatty acid alkanolamides, those having a C<sub>8-18</sub>, especially C<sub>10-16</sub> acyl group are preferred. The fatty acid alkanolamides may be either monoalkanolamides or

dialkanolamides, and those having a C<sub>2-3</sub> hydroxyalkyl group are preferred. Examples include oleic diethanolamide, palm kernel fatty acid diethanolamide, coconut fatty acid diethanolamide, lauric diethanolamide, polyoxyethylene coconut fatty acid monoethanolamide, coconut fatty acid monoethanolamide, lauric isopropanolamide and lauric monoethanolamide.

[0035]

As the amphoteric surfactant, betaine surfactants are usable. Of these, alkyldimethylaminoacetic betaines and fatty acid amidopropyl betaines are more preferred, with fatty acid amidopropyl betaines being particularly preferred. The fatty acid amidopropyl betaines preferably have a C<sub>8-18</sub>, especially C<sub>10-16</sub> acyl group. Of these, lauramidopropyl betaine, palm kernelamidopropyl betaine and cocoamidopropyl betaine are especially preferred.

[0036]

To the hair detergent composition of the present invention, a conditioning component selected from cationic polymers, cationic surfactants, silicones other than Component (c) and oils can be added in order to improve the finish after drying.

[0037]

Examples of the cationic polymer include cationized cellulose derivatives, cationic starch, cationized guar gum

derivatives, homopolymers of diallyl quaternary ammonium salts, diallyl quaternary ammonium salt/acrylamide copolymers, quaternized polyvinylpyrrolidone derivatives, polyglycol polyamine condensates, vinylimidazolium trichloride/vinylpyrrolidone copolymers, hydroxyethyl cellulose/dimethyldiallylammonium chloride copolymers, vinylpyrrolidone/quaternized dimethylaminoethyl methacrylate copolymers, polyvinylpyrrolidone/alkylamino acrylate copolymers, polyvinylpyrrolidone/alkylamino acrylate/vinylcaprolactam copolymers, vinylpyrrolidone/methacrylamidopropyl trimethylammonium chloride copolymers, alkylacrylamide/acrylate/alkylaminoalkylacrylamide/polyethylene glycol methacrylate copolymers, adipic acid/dimethylaminohydroxypropyl ethylenetriamine copolymer ("Cartaretin", product of Sandoz/USA), and cationic polymers as described in Japanese Patent Laid-Open Nos. 139734/1978 and 36407/1985. Of these, cationized cellulose derivatives and cationized guar gum derivatives are particularly preferred.

[0038]

Examples of the cationic surfactant include lauryl trimethyl ammonium chloride, cetyl trimethyl ammonium chloride, cetyl trimethyl ammonium bromide, stearyl trimethyl ammonium chloride, stearyl trimethyl ammonium



bromide, lauryl trimethyl ammonium bromide, behenyl trimethyl ammonium chloride, dialkyl dimethyl ammonium chloride, dicetyl dimethyl ammonium chloride, distearyl dimethyl ammonium chloride, dicocoyl dimethyl ammonium chloride, myristyl dimethyl benzyl ammonium chloride, stearyl dimethyl benzyl ammonium chloride, lanolin fatty acid aminopropylethyl dimethyl ammonium ethyl sulfate, lanolin fatty acid aminoethyl triethyl ammonium ethyl sulfate, stearyl amidopropyl dimethylamine (and salts thereof), stearyl amidoethyl diethylamine (and salts thereof), stearoxy propyl dimethylamine (and salts thereof), stearoxy propyl trimethyl ammonium chloride, lanolin fatty acid aminopropyl triethyl ammonium ethyl sulfate, lanolin fatty acid aminoethyl trimethyl ammonium methyl sulfate, lanolin fatty acid aminopropylethyl dimethyl ammonium methyl sulfate, isoalkanoic acid (C<sub>14-20</sub>) aminopropylethyl dimethyl ammonium ethyl sulfate, isoalkanoic (C<sub>18-22</sub>) aminopropylethyl dimethyl ammonium ethyl sulfate, isostearic acid aminopropylethyl dimethyl ammonium ethyl sulfate, isononanoic acid aminopropylethyl dimethyl ammonium ethyl sulfate and alkyl trimethyl ammonium saccharine.

[0039]

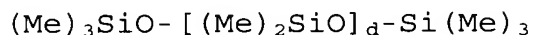
As the silicones other than Component (c), the following compounds can be given as examples.

[0040]

(Silicones-1) Dimethylpolysiloxane

Examples include compounds represented by the following formula:

[0041]



[0042]

wherein, Me represents a methyl group and d stands for 3 to 20000.

[0043]

(Silicones-2) Amino-modified silicone

Various amino-modified silicones are usable, but those having an average molecular weight of from about 3000 to 100000 and described under the name of Amodimethicone in CTFA Dictionary (Cosmetic Ingredient Dictionary, USA), third edition are particularly preferred. This amino-modified silicone is preferably employed in the form of an aqueous emulsion and "SM 8704C" (product of Dow Corning Toray Silicone), "DC 929" (product of Dow Corning), etc. are the commercially available products of the aqueous emulsion.

[0044]

(Silicones-3) The other silicones

As well as the above-described silicones, usable are polyether-modified silicones, methylphenyl polysiloxane,

fatty-acid-modified silicones, alcohol-modified silicones, alkoxy-modified silicones, epoxy-modified silicones, fluorine-modified silicones, cyclic silicones, and alkyl-modified silicones.

[0045]

The term "oils" to be used herein as the conditioning component means an oily substance other than silicones and examples include hydrocarbons such as squalene, squalane, liquid paraffin, liquid isoparaffin and cycloparaffin; glycerides such as castor oil, cacao oil, mink oil, avocado oil and olive oil; waxes such as beeswax, spermaceti, lanolin and carnauba wax; alcohols such as cetyl alcohol, oleyl alcohol, stearyl alcohol, isostearyl alcohol, 2-octyldodecanol and glycerin; esters such as isopropyl palmitate, isopropyl myristate, octyldodecyl myristate, hexyl laurate, cetyl lactate, propylene glycol monostearate, oleyl oleate, hexadecyl 2-ethylhexanoate, isononyl isononanoate, and tridecyl isononanoate; higher fatty acids such as capric acid, lauric acid, myristic acid, palmitic acid, stearic acid, behenic acid, oleic acid, coconut fatty acid, isostearic acid and isopalmitic acid; and isostearyl glyceryl ether and polyoxypropylene butyl ether. Of these, esters, particularly hexadecyl 2-ethylhexanoate, isononyl isononanoate and isopropyl palmitate are particularly preferred.

[0046]

As the conditioning component, two or more of these compounds may be used either singly or in combination. Its content in the hair detergent composition of the invention preferably ranges from 0.05 to 10 wt.%, more preferably from 0.07 to 5 wt.%, especially preferably from 0.1 to 2 wt.% from the viewpoints of lubrication of foams, and smoothness during the time from shampooing to rinsing.

[0047]

In addition to the above-described components, components conventionally used for a hair detergent can be incorporated in the hair detergent composition of the present invention, depending on the using purpose. Such optional components include antidandruff, vitamins, bactericides, anti-inflammatory agents, antiseptics, chelating agents, humectants such as sorbitol and panthenol, colorants such as dyes and pigments, viscosity regulators such as hydroxyethyl cellulose, methyl cellulose, polyethylene glycol and clay minerals; pH regulators such as potassium hydroxide; vegetable extracts; pearling agents; perfumes; coloring matters; ultraviolet absorbers; antioxidants; and the other components as described in *ENCYCLOPEDIA OF SHAMPOO INGREDIENTS* (MICELLE PRESS).

[0048]

The hair detergent compositions of the present

invention are preferably adjusted to pH (diluted to 20 times the weight with water, at 25°C) 4.5 or less upon application to the hair from the viewpoint of imparting the hair with luster and flexibility. In order to prevent the compositions from causing irritation, their pH is preferably adjusted to from 1 to 4.5, more preferably from 2 to 4.5, especially preferably from 3 to 3.9. For the adjustment of the pH, the carboxylic acid serving as Component (b) and also an alkali agent such as potassium hydroxide is usable.

[0049]

Although the form of the hair detergent compositions of the invention can be selected as needed from liquid, powder, gel and granule, a liquid type using water as a solvent is preferred.

[0050]

The hair detergent compositions of the invention are preferably used as a hair shampoo composition.

[0051]

[Examples]

Examples 1 to 3 and Comparative Examples 1 to 3

Shampoo compositions as shown in Table 1 were prepared and they were organoleptically evaluated.

[0052]

(Hair washing method)

After the hair was wet sufficiently, 5 g or 10 g (5 g for medium-length hair and 10 g for long hair) of the shampoo composition was applied and the hair was washed therewith. The hair was then rinsed well with water, followed by sufficient drying with hot air from a dryer.

[0053]

(Organoleptic Evaluation)

The shampoo compositions were evaluated by a panel of 10 experts based on the below-described criteria and ranked based on the average score.

[0054]

Evaluation criteria

(1) Softness of the hair during foaming

- 4: Very soft
- 3: Soft
- 2: Slightly soft
- 1: Slightly rigid
- 0: Rigid

[0055]

(2) Smoothness of the hair during rinsing and after drying

- 4: Very smooth
- 3: Smooth
- 2: Slightly smooth
- 1: Not so smooth
- 0: Not smooth

[0056]

(3) Luster of the hair after drying

4: A marked improvement in luster is observed.

3: An improvement in luster is observed.

2: A slight improvement in luster is observed.

1: No improvement in luster is observed.

0: Luster is lost.

[0057]

Rank

A: an average score of 3.5 or greater

B: an average score of 2.5 or greater but less than  
3.5

C: an average score of 1.5 or greater but less than  
2.5

D: an average score less than 1.5

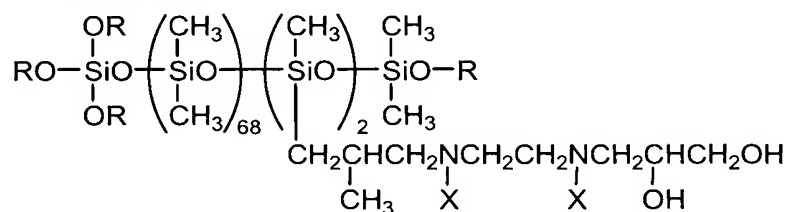
[0058]

[Table 1]

Composition (wt.%)		Examples			Comparative Examples		
		1	2	3	1	2	3
(a)	Sodium polyoxyethylene (2) lauryl ether sulfate	10.0	10.0	10.0	10.0	10.0	10.0
(b)	Malic acid	1.0	1.0	-	1.0	1.0	1.0
	Maleic acid	-	-	1.0	-	-	-
(c)	Silicon derivative *	0.5	0.5	0.5	0.5	-	-
Others	Propylene carbonate	1.0	-	1.0	1.0	1.0	1.0
	Benzoyloxyethanol	-	1.0	-	-	-	-
	Amino-modified silicone ("KT1989!", product of GE Toshiba Silicone)	-	-	-	-	-	0.5
	Cocamidopropyl betaine	3.0	3.0	3.0	3.0	3.0	3.0
	Cocamide MEA	1.0	1.0	1.0	1.0	1.0	1.0
	Ethylene glycol distearyl ester	1.0	1.0	1.0	1.0	1.0	1.0
	Cationized cellulose ("Ucare Polymer JR-400", product of Amerchol)	0.5	0.5	0.5	0.5	0.5	0.5
	Sodium chloride	0.5	0.5	0.5	0.5	0.5	0.5
	Perfume	Trace	Trace	Trace	Trace	Trace	Trace
	Aqueous solution of sodium hydroxide	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.
	Purified water	Balance	Balance	Balance	Balance	Balance	Balance
pH (after diluted to 20 times the weight)		3.5	3.5	3.5	6.0	3.5	3.5
Evaluation	Softness of hair during foaming	A	A	A	A	C	B
	Smoothness of hair during rinsing	A	A	A	A	C	D
	Smoothness of hair after drying	A	A	A	B	C	C
	Luster upon drying	A	A	A	C	B	C

[0059]

\*silicone derivative:

R: C<sub>13</sub>H<sub>27</sub> to C<sub>15</sub>H<sub>31</sub>X: 75% for a group: -CH<sub>2</sub>CH(OH)CH<sub>2</sub>OH and 25% for hydrogen atom

[0060]

## Example 4: Conditioning shampoo

	(wt.%)
Sodium polyoxyethylene (2) lauryl ether sulfate	11.0
Lactic acid	0.75
Malic acid	0.25



Silicone derivative *1	1.0
Polypropylene glycol (M <sub>w</sub> =400)	0.5
Cocamidopropyl betaine	3.0
Cocamide MEA	0.5
Ethylene glycol distearyl ester	1.0
Cationized guar gum	
("Jaguar C-13S", product of RHODIA)	0.4
Sodium chloride	0.3
Perfume	trace
Aqueous solution of sodium hydroxide	q.s.
Purified water	Balance

\*1: sold from Dow Corning under the name of "8500 CONDITIONING AGENT". It contains, as an effective ingredient, 60 wt.% of a silicon derivative (CAS No. 237753-63-8) having a group containing both a hydroxyl group and a nitrogen atom as a side chain.

[0061]

It has been found that the shampoo (having pH 3.9 when diluted to 20 times the weight) thus obtained was excellent in smoothness during the time from foaming to rinsing, smoothness after drying and luster.

[0062]

Example 5: Conditioning shampoo

	(wt.%)
Sodium polyoxyethylene (2) lauryl ether sulfate	10.0

Sodium lauryl sulfate	5.0
Malic acid	0.5
Lactic acid	0.5
Silicon derivative *1	0.3
Benzyl alcohol	0.5
N-methylpyrrolidone	0.2
Cyclohexanone	0.2
Cocamide MEA	1.0
Myristyl alcohol	1.0
Cetanol	0.5
Behenyl trimonium chloride	0.3
Dimethyl polysiloxane (viscosity: 100000 mPa·s)	0.3
Glycerin	1.0
Cationized guar gum ("Jaguar C-13S", product of RHODIA)	0.4
Sodium chloride	0.2
Perfume	trace
Aqueous solution of sodium hydroxide	q.s.
Purified water	Balance

\*1: sold from Dow Corning under the name of "8500 CONDITIONING AGENT". It contains, as an effective ingredient, 60 wt.% of a silicon derivative (CAS No. 237753-63-8) having a group containing both a hydroxyl group and a nitrogen atom as a side chain.

[0063]

It has been found that the shampoo thus obtained (having pH of 3.7 when diluted to 20 times the weight) was excellent in smoothness during the time from foaming to rinsing, smoothness after drying and luster.

[0064]

[Effect of the Invention]

The hair detergent composition of the present invention provides rich foaming during shampooing and at the same time, is capable of giving excellent conditioning effects and luster to the hair.

[Document Name] Abstract

[Abstract]

[Means for solving]

A hair detergent composition comprising the following components (a), (b) and (c):

(a) an anionic surfactant,

(b) a carboxylic acid selected from hydroxymonocarboxylic acids, dicarboxylic acids and hydroxydicarboxylic acids, and salts thereof, and

(c) a silicone derivative having, as a side chain thereof bonded to a silicon atom, a group containing both a hydroxyl group and a nitrogen atom.

[Effect]

The hair detergent composition provides rich foaming during shampooing and at the same time, is capable of giving excellent conditioning effects and luster to the hair.

[Selected Drawings] None